0.a. Goal

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

0.b. Target

Target 8.4: Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead

0.c. Indicator

Indicator 8.4.2: Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

0.d. Series

Domestic material consumption, by type of raw material (tonnes) EN_MAT_DOMCMPT

Domestic material consumption per unit of GDP, by type of raw material (kilograms per constant 2015 United States dollars) EN_MAT_DOMCMPG

Domestic material consumption per capita, by type of raw material (tonnes) EN_MAT_DOMCMPC

0.e. Metadata update

2022-08-12

0.f. Related indicators

8.4.1, 12.2.1, 12.2.2

0.g. International organisations(s) responsible for global monitoring

United Nations Environment Programme (UNEP)

1.a. Organisation

United Nations Environment Programme (UNEP)

2.a. Definition and concepts

Definitions:

Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy.

DMC measures the total amount of material (biomass, fossil fuels, metal ores and non-metallic minerals) directly used in an economy and based on accounts of direct material flows, i.e., domestic material extraction and physical imports and exports.

Concepts:

DMC and Material Footprint (MF) need to be looked at in combination, as they cover the two aspects of the economy, production and consumption. The DMC reports the actual amount of material in an economy, MF the virtual amount required across the whole supply chain to service final demand. A country can, for instance, have a very high DMC because it has a large primary production sector for export or a very low DMC because it has outsourced most of the material intensive industrial process to other countries. The material footprint corrects for both phenomena.

2.b. Unit of measure

Tonnes;

Kilograms per constant United States dollar;

Tonnes per capita.

2.c. Classifications

- Material categories accordance to the global EW-MFA guide “UNEP (2021). The use of natural resources in the economy: A Global Manual on Economy Wide Material Flow Accounting” (https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&isAllowed=y);
- Standard Country or Area Codes for Statistical Use (UN M49 classification of countries and regions)

3.a. Data sources

The global estimation of DMC is based on data available from different national and international datasets in the domain of agriculture, forestry, fisheries, mining and energy statistics. International statistical sources for DMC include the International Energy Agency, the United Nations Statistical Division, the United States Geological Survey, the Food and Agriculture Organisation and COMTRADE databases.

3.b. Data collection method

For global estimation, the International Resource Panel (IRP) Global Material Flows and Resource Productivity working group compiles the data from national and international databases.

At the same time, country-provided indicators are collected through the QUESTIONNAIRE ON ECONOMY WIDE MATERIAL FLOW ACCOUNTS for the SDG indicators 8.4.1/12.2.1 and 8.4.2/12.2.2.

3.c. Data collection calendar

First data collection in 2022 and every 2 to 3 years after.

3.d. Data release calendar

First data release in 2017, the second in 2021 (fully estimated data). Then, in 2022 and every 2 to 3 years after (both globally estimated and country data).

3.e. Data providers

National Statistical Offices

3.f. Data compilers

United Nations Environment Programme (UNEP), Organization for Economic Co-operation and Development (OECD) and EUROSTAT

3.g. Institutional mandate

UNEP was mandated as Custodian Agency for indicator 8.4.2 / 12.2.2 by the Inter-agency and Expert Group on SDG Indicators. UNEP IRP is the mechanism within UNEP supporting all work aspect in relation to Material Flow Accounting.

4.a. Rationale

Domestic Material Consumption (DMC) reports the amount of materials that are used in a national economy. It is a territorial (production side) indicator. DMC also presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. It describes the physical dimension of economic processes and interactions. It can also be interpreted as long-term waste equivalent. Per-capita DMC describes the average level of material use in an economy – an environmental pressure indicator – and is also referred to as metabolic profile.

4.b. Comment and limitations

Domestic Material Consumption cannot be disaggregated to economic sectors which limits its potential to become a satellite account to the System of National Accounts (SNA).

4.c. Method of computation

Domestic Material Consumption (DMC) is a standard material flow accounting (MFA) indicator. MFAs below to environmental-economic accounts and apply the accounting concepts, structures, rules and principles of the System of Environmental-Economic Accounting 2012 - Central Framework. It should be used in conjunction with reading the global EW-MFA guide The use of natural resources in the economy: A Global Manual on Economy Wide Material Flow Accounting (https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&isAllowed=y).

Domestic Material Consumption (DMC), by type of raw material (tonnes) is calculated as:

$DMC = DE + IM - EX$,

Where:

DMC – domestic material consumption;

DE – domestic extraction of materials;

IM – direct imports;

EX – direct exports.

DMC measure the amount of materials that are used in economic processes. It does not include materials that are mobilized for the process of domestic extraction but do not enter the economic process.

Domestic material consumption per capita, by type of raw material (tonnes), is calculated as:

$$DMC\ per\ capita = \frac{DMC}{Annual\ average\ population}$$

Domestic material consumption per unit of GDP, by type of raw material (kilograms per constant 2015 United States dollars), is calculated as:

$$DMC\ per\ GDP = \frac{DMC}{GDP\ in\ constant\ 2015\ United\ States\ Dollars}$$

4.d. Validation

United Nations Environment Programme (UNEP) sends a prefilled questionnaire with estimated data to the National Statistical Office (NSO) Focal Points (FP) with a request to validate globally estimated data for this indicator and replace the data if needed/possible. The FPs coordinate data validation with stakeholders within their countries and report back the data to UNEP. For countries with no national data collected for this indicator, UNEP asks to agree on publishing and releasing the estimated data on UNEP's World Environment Situation Room and UNSD SDG Global database.

4.e. Adjustments

UNEP replaces globally estimated data by national data if requested by the country.

4.f. Treatment of missing values (i) at country level and (ii) at regional level

• At country level:

A zero is imputed when no positive real value was officially recorded, in the base data sets used, for any of the underlying components which make up this aggregated total. Thus “0.0” can represent either NA, or a genuine 0.0, or (crucially) a combination of both, which is a common situation. This allows for values to be easily aggregated further; however, it should be thus noted that due to imputing missing values as “0.0”, the aggregations may represent a lower value than the actual situation.

• At regional and global levels:

Similarly, missing values are imputed as zero in the regional and global aggregations. However, in the case where no data is available at all for a particular country, the per capita and per GDP estimates are weighted averages of the available data.

4.g. Regional aggregations

The data are aggregated at the sub-regional, regional and global levels. For the aggregation methods, please see: http://wesr.unep.org/media/docs/graphs/aggregation_methods.pdf

4.h. Methods and guidance available to countries for the compilation of the data at the national level

United Nations Environment Programme (UNEP), jointly with the International Resource Panel (IRP) and United Nations Statistics Division (UNSD), the Statistical Office of the European Union (Eurostat) and the Organisation for Economic Co-operation and Development (OECD) have developed a global manual on Economy-Wide Material Flow Accounting (EW-MFA) which brings in the European guidelines, but provides a modular approach for countries looking to develop EW-MFA for the first time and it addresses specific issues related to resource extractive based economies.

- UNEP (2021). The use of natural resources in the economy - A Global Manual on Economy Wide Material Flow Accounting: https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&isAllowed=y
- EUROSTAT (2018). The EU Economy-wide material flow accounts handbook 2018:https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-18-006

4.i. Quality management

Quality management is provided by United Nations Environment Programme (UNEP), jointly with International Resource Panel (IRP), using the Global Manual on Economy-Wide Material Flow Accounting (UNEP, 2021).

4.j. Quality assurance

Quality assurance is provided by United Nations Environment Programme (UNEP), jointly with International Resource Panel (IRP), using the Global Manual on Economy Wide Material Flow Accounting (UNEP, 2021).

4.k. Quality assessment

Quality assessment is provided by United Nations Environment Programme (UNEP), jointly with International Resource Panel (IRP), in consultation with countries (nominated Focal Points) after receiving their feedback on the globally estimated indicators.

5. Data availability and disaggregation

Data availability:

The data covers 193 countries (either globally estimated or country data).

Time series:

The data set presented in the SDG database covers a time period of 20 years (2000-2019).

The International Resource Panel (IRP) publishes estimated data series for 1970-2019 on its website.

Disaggregation:

The Domestic Material Consumption (DMC) indicator is disaggregated by main material categories (biomass, fossil fuels, metal ores and non-metallic minerals).

6. Comparability/deviation from international standards

Domestic Material Consumption is calculated coherent with international standards, recommendations, and classifications such as the System of National Accounts 2008, the System of Environmental-Economic Accounting – Central Framework 2012, the Balance of Payments and International Investment Position, the International Standard Industrial Classification of All Economic Activities (ISIC), the Central Product Classification (CPC) and the Framework for the Development of Environment Statistics.

Sources of discrepancies:

Not applicable

7. References and Documentation

URL:

UNEP (2021), The use of National Resources in the Economy: a Global Manual on Economy Wide Material Flow Accounting.
https://wedocs.unep.org/bitstream/handle/20.500.11822/36253/UNRE.pdf?sequence=3&isAllowed=y

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EUROSTAT (2018). The EU Economy-wide material flow accounts handbook 2018: https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-18-006

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Lenzen, M., Moran, D., Kanemoto, K., Geschke, A. (2013) Building Eora: A global Multi-regional Input-Output Database at High Country and Sector Resolution, Economic Systems Research, 25:1, 20-49.